YOUR MISSION IN SPACE

Lesson 1: Space Jobs

OVERVIEW	Students will choose where they are going on their first mission to space and why they are going there. They will decide who they are bringing with them on their space mission, utilizing their previous knowledge of careers in Astrobiology. They will decide why each crew member is important to have with them on their mission. **Duration: 45-60 minutes.**
SUCCESS CRITERIA	• Students can explain the key components of a successful space mission.. • Students can list at least one goal for their space mission. • Students can choose the destination for their space mission and explain why that location is important for exploration. • Students can identify which types of people and jobs would be needed for this mission to be successful and explain their roles.
ARIZONA STANDARDS	**Career Development K-5 (Standard 5.0)** • Identify future aspirations and discuss how they fit their wants and needs. • Identify career interests, abilities, and skills. • Engage in activities to learn about career clusters and the future of work trends. • Explore jobs, occupations, and careers to understand the value of all careers to society **Core Ideas for Using Science** • U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.
NGSS STANDARDS	• **Science and Engineering Practices - Asking Questions and Defining Problems** (Students explore scientific questions related to space missions and the search for extraterrestrial life) • **Science and Engineering Practices - Obtaining, Evaluating, and Communicating Information** (Students analyze how different scientific careers contribute to astrobiology and space exploration and reflect on how their own skills align with different scientific fields) • **Nature of Science (NOS) Connections - Science is a Human Endeavor** (Scientific discoveries result from collaboration between people of different backgrounds, disciplines, and expertise)
MATERIALS	• Space Jobs PowerPoint (found on the AABC website) • Crayons or markers • Paper or posters • Planet Scenarios (These can be found on the AABC website in the form of a PowerPoint. We recommend you print them so that you can hand out one scenario to each group. If you did the "Extreme Life" lessons prior to these lessons, you can also choose to use the planets students created in those lessons.)

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VOCABULARY

- **Astrobiology**: The science of exploring how life began, how it grows, and where we can find it on Earth or beyond Earth.
- **Astronaut**: A person who travels and works in space. They could go around Earth or even to the Moon or Mars.
- **Planet:** A large round body that orbits a star and is made of rock, gas, or ice, like Earth or Mars.
- **Mission:** A specific task or goal for a spacecraft, such as going to a planet or sending a satellite into space.

SET UP

- Prepare the Planet Scenarios as described in the "Materials" section.
- Prepare to show the "Space Jobs" PowerPoint.

LESSON PROCEDURE

Introduction (10 minutes)

- Explain to the students that they are going to pretend to be astronauts going on a big adventure. They'll need to decide on (or be assigned to) a planet, choose a team, and get ready for the trip!
- Divide the class into groups of 3-4.
- Explain to the students that their team is going to visit an exoplanet - a planet beyond our Solar System. Tell them that the planets you are about to describe are real planets, but they are very far away.
- Note to Teacher: The illustrations on these Planet Scenarios are artists' renditions. These planets are too far away for us to obtain a real picture.
- Hand out each Planet Scenario, showing the class the picture of the planet and reading the description, before handing it off to a group.
    - Alternative 1: For smaller classes, you can have each group choose which planet they will visit.
    - Alternative 2: If you completed the "Extreme Life" lessons, you could have students choose to instead visit the fictional planets they created.

Activity 1: Select the Crew (15-25 minutes)

- Tell the class, "Now that you have your planet, it's time to assemble a crew!"
- Show the Space Jobs PowerPoint, stopping to discuss and take comments as needed. It may be helpful to write a list of the jobs on a poster or whiteboard to reference later.
- Have the students gather into their groups and talk about what role they will choose for themselves and why. You might ask them to share their answers as a class or older students could write down why they think they would be good at that job.
- Using paper or a small poster, have students work together to draw a picture of their space crew, with each person's name and profession written above the picture.

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LESSON PROCEDURE	**Activity 2: Mission Planning (10-20 minutes)**
	• Instruct each group to title their crew picture "Mission to _____" with the name of the world they are going to explore.
	• As a class, discuss what kind of goals their mission might have. These might include:
	  ◦ Assessing Habitability: We can check if we can live there by finding out if the planet has water, air, and atmosphere and monitor the temperature and other conditions needed for life.
	  ◦ Studying Ecosystems: See if there are any signs of plants, or microbial life or animals.
	  ◦ Resource Identification: Use instruments to determine whether minerals or other specific types of elements exist.
	  ◦ Technological Testing: Test cool gadgets by trying out new machines and tools to see if they would work in space or on other planets.
	  ◦ Geology Research: Study rocks, weather, and soil to learn about the history and evolution of the planet.
	  ◦ Establishing a Base: Build a space camp by setting up a small base where astronauts can stay and work during future missions.
	  ◦ Cultural Exchange: Meet aliens by talking to them and learning about their way of life and technology, if there are any.
	• Invite the students to gather in their groups and roleplay the jobs they chose in the previous activity. While roleplaying their jobs, they must determine the top three goals for their mission. For older students, have them write the goals on their group's poster.
	• If time allows, have each group present their space mission to the class. They can discuss why they chose their planet, who is on their crew, and what they hope to find on their mission.

EXTENSIONS AND TAKE HOME ACTIVITIES	• Space-Themed Storybook Time: Read an astronaut-themed book such as *Mousetronaut* by Mark Kelly (https://www.youtube.com/watch?v=sK-ZlrXjk0s) • Exoplanet Exploration: Visit the Exoplanet Travel Bureau (https://exoplanets.nasa.gov/alien-worlds/exoplanet-travel-bureau/?intent=021) for a fun look at other Exoplanets in our galaxy, including some "guided tours" that might be fun to explore as a class.

This module was created by Lauren Bollinger, an elementary school educator at Bloom Elementary in Tucson, AZ, in collaboration with the Arizona Astrobiology Center. It is supported and distributed by the University of Arizona's Astrobiology Center with funding from the Marshall Foundation, Tucson, AZ. For more information, contact Lauren James at laurenjames@arizona.edu.